Guidance to Chapter Authors on Eight Priority Topics for the 2013 National Climate Assessment
UPDATED April, 2012

This document is intended to give guidance to chapter authors on several topics that are priorities for the 2013 NCA[1]: 1) risk framing, 2) assessing confidence levels and uncertainty, 3) scenarios, 4) documentation, information quality, and traceability, 5) international context, 6) research needs, 7) sustained assessment, and 8) a template outline for sectoral and regional chapters. This document is not intended to be an exhaustive resource on all these topics; rather, it is intended to be brief and hit the high points.

For author workspaces and resources, please log in to http://resources.assessment.globalchange.gov/.

1) Risk Framing Guidelines

Please see http://downloads.usgcrp.gov/NCA/Guidance/2012-2-10_Uncertainty-RiskFraming-Guidelines.pdf for the full guidance.

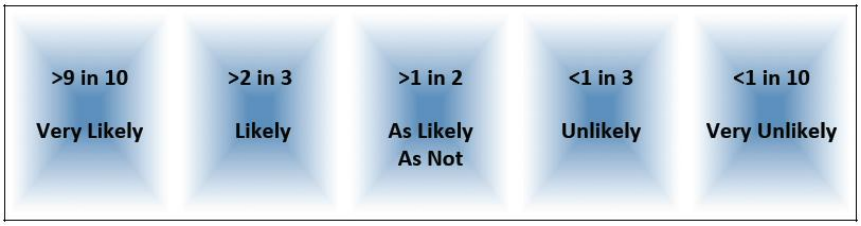
Some potential impacts could be of such high consequence for society that stakeholders consider them to be "key vulnerabilities" because of their magnitude, timing, persistence/irreversibility, limited potential for adaptation, distributional aspects, likelihood, or other attributes. For 1-2 of these high consequence impacts, please estimate the risk presented as clearly as possible. As indicated below, this involves (i) using a well-defined metric to describe the consequences of the impact (quantitatively, if possible) and (ii) using standardized terms/ranges to estimate the likelihood the impact will occur. Authors are encouraged to use the climate information provided in the relevant "trends and outlook" document in making these judgments.

Author teams should follow these steps to describe the risks (consequences and likelihood) of key vulnerabilities:

1. Describe an impact that is a potential or existing source of societal concern.
2. Estimate the consequences of that impact (numerically if at all possible) for climate change associated with the B1 and A2 scenarios (as described in the relevant regional or national climate change "trends and outlook" document, or another source if you prefer).
    - Define the metric of consequence (e.g., economic consequences, human health consequences) and describe the rationale for approach selected.
    - In defining the consequences, consider the potential for adaptation, not just the magnitude of impacts associated with different climate futures.
    - If possible, describe additional consequences that result from the interactions of climate-induced impacts with other stresses such as air/water pollution, land-use fragmentation, or biodiversity loss.

[1] Earlier versions of this document were intended for technical input authors in addition, for inputs due in March, 2012. This version has been updated and edited for the use of chapter authors.

3. Using the climate information provided in the relevant regional or national climate change "trends and outlook" document (or another source, if you prefer), describe how likely it is that the consequence will materialize under climate change associated with the B1 and A2 scenario for the periods centered around 2035, 2055, and 2085. Use the following probability terms and ranges below. It is okay to use just the numerical ranges, but do not use the words alone since they have no standardized meaning.



4. Summarize this information and describe the criteria you have used to define this as a "key vulnerability".

2) *Assessing and Communicating Confidence Levels and Uncertainties in the Main Conclusions of the NCA 2013 Report*

Please see http://downloads.usgcrp.gov/NCA/Guidance/2012-2-10_NCA%20Confidence%20Assessment%20Resources.pdf for the full guidelines and resources for assessing confidence and uncertainty (includes a summary, guidelines, checklist and bibliography).

Readers of the report wish to understand how confident lead authors are in the most important findings of their chapters. Follow these steps to carefully frame and assess your confidence in the 3-4 most important conclusions of your chapter. These steps are relevant to a broad set of conclusions that address the topics identified in the Global Change Research Act, including advances in the state of knowledge since the 2009 report. Note that users of the report may wish to have even limited information because of the timing of a related decision or the importance of the issue, even if your confidence level is low.

1. Frame the issue or pose the question, keeping in mind one or more types of stakeholder decisions the information is intended to inform.

2. Rate the evidence base, evaluating the type, amount, quality, and consistency of evidence. Summarize the level of evidence as strong, moderate, suggestive, or inconclusive.

3. Considering the full gamut of evidence, formulate well-posed conclusions. For quantitative estimates, report a range in which you judge there is a 90 percent chance that the true value falls and then develop a "best estimate" if there is enough evidence to warrant it. Describe high consequence, low probability impacts that may fall outside the 90 percent range.

4. Identify key uncertainties and briefly describe the research, monitoring, etc., needed to improve the evidence.

5. Given the potential uses of the information identified in step 1, assess your confidence in the conclusion by considering (i) the quality of the evidence (from step 2) and (ii) the level of agreement among experts with relevant knowledge. Use the confidence rating and associated graphic below.

Confidence Level	Example combinations of factors that could contribute to this confidence evaluation
High	Strong evidence (established theory, multiple sources, consistent results, well documented and accepted methods, etc.), high consensus
Medium High	Moderate evidence (several sources, some consistency, methods vary and/or documentation limited, etc.), medium consensus
Medium Low	Suggestive evidence (a few sources, limited consistency, models incomplete, methods emerging, etc.), competing schools of thought
Low	Inconclusive evidence (limited sources, extrapolations, inconsistent findings, poor documentation and/or methods not tested, etc.), disagreement or lack of opinions among experts

6. If you wish to indicate how likely an outcome is, use the language and approach described in step 3 of the risk framing guidelines above.

7. Prepare a traceable account of a sentence to a paragraph in length that describes in simple language the main factors that support the conclusion and your level of confidence. If the conclusion is framed in terms of risk, confirm the criteria by which you have concluded that this represents a "key vulnerability" and provide a traceable account of your selection process.

3) ***Scenarios***

More detailed information about the NCA scenarios strategy (including the scenarios strategy, background documents, as well as useful links) is available at http://resources.assessment.globalchange.gov/scenario/us-national-climate-assessment-scenarios.

- To bound uncertainty about future climate conditions and to take advantage of existing research, the National Climate Assessment and Development Advisory Committee (NCADAC) has specified

that writing teams and those providing technical inputs to the assessment assume climate change consistent with the IPCC Special Report on Emissions Scenarios (SRES) B1 and A2 emissions scenarios. In addition to this minimum set, other scenarios can be assumed as well (e.g., new results from CMIP5 using RCP8.5 and RCP2.6). Groups should indicate the scenario assumed in developing a finding and contrast and compare results with those consistent with the SRES B1 and A2 scenarios.

- Documents describing climate change historical trends and future outlooks have been prepared for each of the NCA regions and the Nation as a whole. Draft documents are provided for use by 2013 report chapter authors. Revisions are underway to better express on maps and elsewhere the variability between results produced using different climate models. The current drafts are not for further distribution.
- Climate change simulations consistent with IPCC SRES B1 and A2 scenarios that are used in the assessment should be produced by one or more of the following four global climate models: (1) Canadian Global Climate Model version 3 (CGCM3), (2) NCAR Community Climate Model Version 3 (CCSM3), (3) Geophysical Fluid Dynamics Laboratory (GFDL) Climate Model Version 2.1 (CM2.1), or (4) United Kingdom (UK) Hadley Centre Climate Model Version 3 (HadCM3). Relevant results derived using these models are available through the CMIP3 data archive (http://www-pcmdi.llnl.gov/ipcc/about_ipcc.php).
- Teams requiring higher resolution climate change data should make use of:
    - North American Regional Climate Change Assessment Program (NARCCAP) results in cases where dynamical downscaling methods are desirable (http://www.narccap.ucar.edu/), or
    - Results derived using statistical downscaling methods where these are better suited to an application (e.g., Asynchronous Regional Regression Model (ARRM) data will soon be available at http://cida.usgs.gov/thredds).
- For groups requiring information on sea level changes, a draft narrative description of scenarios consistent with SRES B1 and A2 emissions scenarios is available. This document also provides information about selected regional anomalies. A final version of this document is expected by March 31, 2012. The current draft is not for further distribution.
- Teams requiring information about land cover and land use scenarios are directed to several sources. For baseline land cover characterization, the National Land Cover Database 2006, maintained by the Multi-Resolution Land Characteristics Consortium is recommended (http://www.mrlc.gov/nlcd2006.php). For projections, groups should use the EPA National-Scale Housing-Density Scenarios (http://epa.gov/ncea/global/iclus/). These scenarios have been produced to be consistent with the SRES scenarios, and specific projections for the A1 and B2 scenarios are available.
- Socioeconomic data (historical population data and projections) are available through the Bureau of the Census http://www.census.gov/. In addition, the SRES emissions scenarios are based on underlying narrative descriptions of potential socioeconomic futures, and downscaled data using the logic of these scenarios is available through the EPA website mentioned in the previous bullet.
- Participatory scenario planning is a process used to identify key management questions pertinent to the future development and use of resources in a given region and to consider the implications of uncertain future climate and socioeconomic conditions. Regional and sectoral teams are asked to identify ongoing scenario planning activities in their domain, and report these activities to the scenario team.
- If interested groups wish to engage in scenario planning as inputs to the NCA, they are asked to develop adaptation scenarios to manage impacts associated with the A2 and B1 scenarios. Limited technical assistance is available to support activities of this kind.

- The point of contact for scenarios information: Bill Emanuel, wemanuel@usgcrp.gov.

4) Documentation, Information Quality, and Traceability

To help ensure the overall quality, the NCA authors will be required to assess the quality of all source material and data used by applying the standards set forth in the National Oceanic and Atmospheric Administration's (NOAA) Information Quality Guidelines. The Guidelines are intended to ensure the objectivity, utility and integrity of disseminated information.

Please consult the Question Tools as a guide for how to consider whether and how to use source material in the NCA under the requirements of the Information Quality Act.
http://downloads.usgcrp.gov/NCA/Question-Tools---2-21-12.pdf

For background information:

- General principles for chapter authors approved by the National Climate Assessment and Development Advisory Committee (NCADAC) in November, 2011: http://www.globalchange.gov/images/NCA/Information-Quality-Principles-Draft_2011-11-16.pdf
- Preliminary guidance on information quality assurance provided to technical input teams: http://globalchange.gov/images/NCA/nca-info-quality-assurance-faq.pdf
- NOAA Information Quality Guidelines: http://www.cio.noaa.gov/Policy_Programs/info_quality.html

5) International/Global Context

To make the work of the National Climate Assessment useful to decision makers, the science on climate change and its impacts must be presented in a manner that clearly links it to economic and social impacts. Given the international linkages and global reach of the US economy and US impacts worldwide, thoughtfully and purposefully addressing the interconnectedness of the impacts of climate change outside the borders of the US is critical for the contextual interpretation and application of the National Climate Assessment. Authors are encouraged to include international/global topics in their chapters. For more information, please see the International/Global Working Group Guidance for NCA Writing Teams http://www.globalchange.gov/images/NCA/International-Global-WG_Guidance_2011-11-23.pdf .

Key international issues to be considered for inclusion in each NCA chapter:

- How might U.S. supply and demand chains be affected by climate change outside our borders? For regional and cross-sectional analyses, are there key economic activities that are vulnerable to climate change beyond the region or sector?
- How will global markets and economic growth be affected if resource scarcity or fluctuation is induced by climate change and how might this affect the US economy including consumers, commodity prices and the financial sector?
- How might U.S. investments and programs be impacted, positively and negatively, by climate change and by policies on adaptation and mitigation?

- Are there useful lessons for the US in how other countries, as well as transnational corporations, incorporate climate risks into decision making and in particular, how they address uncertainty, scenarios, adaptation strategies, etc.?

6) Research Needs

Author teams should respond to the SurveyMonkey (link is on the author workspace) survey with preliminary ideas for top 3 research needs and draft text from their chapter section on research needs as soon as possible, and no later than **May 1, 2012**. In addition, each author team should plan to include at least one chapter-specific research need to highlight in their chapter, because not all of the specific needs can be addressed in the Research Needs chapter. The chapter will primarily address overarching issues that arise from multiple chapters.

7) Sustained Assessment

Author teams are encouraged to contact convening lead authors John Hall (John.Hall@osd.mil) and Maria Blair (maria.blair@cancer.org) with ideas for sustaining assessment activities (processes and products) related to topics in your chapter. They are especially interested in ideas that you think should be incorporated into the sustained assessment chapter or that may contribute to the NCADAC sustained assessment work plan (i.e., the advisory committee blueprint for implementing the sustained assessment process beyond the 2013 report). The sustained assessment chapter will primarily address overarching issues that arise from multiple chapters and NCA activities as a whole. Preliminary ideas should be sent by **April 15, 2012**.

8) *Template Outline for Sectoral and Regional Chapters*

The following template is a suggested approach for sectoral and regional chapters.[2]

> Box with bullets: Highlight conclusions and key findings in anticipation of their inclusion into a synthesis document.

1.) Introduction (What do people care about?)
   a. Describe unique or significant characteristics and/or functionalities of the region or sector.
   b. Describe sources of "key" social, economic, cultural, and ecological challenges and opportunities – current and prospects for the future within the region or across the sector, including systems of concern (e.g., watersheds, energy systems, ecosystems).
   c. Catalogue some climate-related vulnerabilities for "key" challenges, opportunities and prospects for the future (e.g. storm surge associated with sea-level rise in coastal regions)

[2] Total page length for items 1-3 should not exceed 8 including graphics[2]; since items 4 and 5 may be moved to other chapters, this information does not need to stay within the 8 pages but should be as brief as possible to be usable.

2.) Significant climate-related impacts (considering changes in variability and trends, natural and anthropogenic changes as appropriate) – if possible, considering the NCA Climate Trends and Outlooks; in all cases, cite accessible literature and/or documented observations[3]:
   a. Detected (observed)(with rationale for association with climate-related changes)
   b. Projected (to the extent useful, tied to the regional or national NCA climate and sea level change scenarios; and if possible, in the context of SRES A2 and B1 scenarios.
   c. Changes in underlying stressors (e.g., socioeconomic conditions, land use changes]) that might affect vulnerabilities.
   d. Changes in extremes; consideration of potential thresholds or tipping points for sensitive systems.

3.) Assess selected "key" climate-related vulnerabilities relative to likelihood and consequence, providing evidence for your conclusions in the "traceable account."[1]
   a. Likelihoods: if possible, characterize likelihoods associated with high and low emissions scenarios (A2 and B1) for different time-slices[4]. Try to express projected changes for different scenarios in relative terms compared to historic/present and to each other.
   b. Consequences:
      i.) describe impacts related to "key" vulnerabilities
      ii.) assess "key" vulnerabilities, and if possible, relate vulnerabilities to projections of socioeconomic conditions, adaptive capacity, and non-climatic sources of stress or opportunity at various scales, including national and international implications.
   c. Adaptation and Mitigation Activities: discuss current or emerging adaptation or mitigation actions, issues, incentives and impediments within regions and/or sectors. Factors to consider include:
      i.) the interactions of adaptation and mitigation strategies/actions with one another and with other factors of development, socioeconomic and ecological context, and stress
      ii.) the benefits (quantitative or qualitative) and lessons learned from adaptation and mitigation actions already in place (including data and perspectives of local, regional, and sectoral actors)
      iii.) progress in reducing risk and/or increasing resilience in the region or sector
      iv.) information needs related to adaptation and mitigation decisions (who needs what kinds of information at what spatial and temporal scale?[5]
4.) Identify knowledge gaps and research priorities associated with this region or sector[6]
5.) Propose or suggest steps in the path towards sustained assessment activities related to topics in your chapter with particular emphasis on areas where capacity building or technical support is needed[7].

[3] Graphics with copious captions is an excellent approach. Graphics should be submitted with the draft chapter that illustrate important scientific conclusions, e.g., related to the "key findings."

[4] The Global Change Research Act indicates 25 and 100 years, but consider all time frames up to 2110 as appropriate.

[5] This information may or may not actually appear in your own chapter; it may be synthesized for use in the mitigation or adaptation chapter

[6] This information may be used in the research needs chapter

[7] This information might be used in the sustained assessment chapter